

REMARKS

This is a response to the final Office Action mailed on January 6, 2011. A request for continued examination (“RCE”) is filed with this response. The Director is authorized to charge \$405.00 for the RCE and any fees that may be required, or to credit any overpayment to Deposit Account No. 02-1818. If such a withdrawal is made, please indicate the Attorney Docket No. 3712161-98 on the account statement.

Claims 23-31 are rejected in this application. Claims 1-6, 7-8, 9-15 and 16-22 were previously canceled. In the Office Action, Claims 23-31 are rejected under 35 U.S.C. §103. In response, Claim 23 has been amended, Claims 24-31 have been canceled, and Claims 32-49 have been added. The amendments do not add new matter. In view of the amendments and/or for the reasons set forth below, Applicants respectfully submit that the rejections should be withdrawn and the application now passed to allowance.

Claims 24-31 have been canceled without disclaimer thereby rendering moot the rejections of these claims.

In the Office Action, Claim 23 is rejected under 35 U.S.C. §103(a) as being unpatentable over WO 00/44241 to Woltjes et al. (“*Woltjes*”), U.S. Patent No. 2001/0026827 to Klingler et al. (“*Klingler*”), U.S. Patent No. 6,375,981 to Gilleland et al. (“*Gilleland*”) and U.S. Patent No. 5,262,191 to Chakraborty et al. (“*Chakraborty*”) in view of the printed publication to Fennema (“*Fennema*”) and the printed publication to Hui (“*Hui*”). Applicants respectfully traverse the rejection for at least the reasons set forth below.

Applicants have amended independent Claim 23 to recite, in part, a candy comprising a starch matrix comprising a microcrystalline-crosslinked network including a first starch comprising a modified starch having a degree of polymerization DPn of more than 1000 and having a low retrogradation tendency. The candy has a rubber-elastic texture that is comparable to textures of products based on gelatin and is produced by extrusion molding. The amendments are supported in the specification, for example, in U.S. Patent Publication No. 2006/0134311, paragraphs 27, 32, 39, 41 and 68.

Conventional candy, based on starch, can be divided into two groups. First, there is candy based on starch with a high amylose content having a pronounced tendency to form a gel at the concentration used. Such starch gels have a tightly meshed, interlinked network with the

network elements being formed by homocrystallites. High gel strengths and high dimensional stabilities result. However, such gels, as do practically all previous starch gels, have a pronounced brittleness and only a slight elongation at break of typically less than 50%, especially in comparison with candy based on gelatin.

Second, there is candy based on starches that do not have any gel-forming tendency worth mentioning at the concentrations used. These are highly viscous liquids, which permit high elongations of more than 100% only within a narrow range of water contents. The starches exist almost completely in an amorphous state. This group of candies includes, in particular, former gummy bears based on starch. At higher water contents (that is, at higher relative humidities), as well as at an elevated temperature (summer), such candy becomes very soft and tends to deliquesce. At low water contents (that is, at low relative humidities) as well as at lower temperatures (e.g., during winter), such candy becomes comparatively hard. The textural properties clearly differ qualitatively and quantitatively from gelatin gummy bears.

Applicants surprisingly found that candy, based on a starch matrix with rubber-elastic properties and high to very high elongations at break, especially with textures very comparable to the textures of products based on gelatin, can be obtained. The solution lies between the two main groups of candy based on starch. It consists of a starch matrix, which, on the one hand, has a high amorphous portion and, on the other, a defined starch network with a low network density. Descriptively, the inventive starch matrix with the amorphous portion has a structure component, which, as is the case with former gummy bears on a starch basis, exhibits a viscous behavior. However, this structure can be intensified and rubber-elastic property characteristics can be introduced by adjusting the network to be defined and minimal.

In comparison to previous jelled candy based on starch, the network has a clearly reduced network density. On the one hand, the linkage points of the network are sufficient for preventing viscous flow of the amorphous portion of the structure and, on the other, the network density is slight or the connecting elements between the linkage points are long enough, so that the structure can be subjected to high deformations without tearing the network. Moreover, in the unstressed state of the matrix, the connecting elements are in a state of high entropy or in a tangled state and can be stretched when stressed. The restoring force, comparable with that of gum, has its basis in the entropy elasticity.

In the stricter sense, the claimed candy is related to the production of such defined networks with rubber elastic property features. Compared to proteins, which, in the case of gelatin, form a network, starch macromolecules are comparatively rigid and inelastic, as a result of which the adjustment to a rubber elastic behavior is made more difficult. However, this problem can be eased by using large starch macromolecules having a low retrogradation tendency so that a starch network having a low network density and high amorphous portions is obtained. As further specified in U.S. Patent Publication No. 2006/0134311, for example paragraph 27, a modification and especially, a substitution of the starch and/or using starches having a low amylose content influences the retrogradation tendency.

Applicants respectfully submit that the cited references are deficient with respect to the present claims. *Woltjes, Klingler, Gilleland, Chakraborty, Fennema and Hui* alone or in combination fail to disclose or suggest a first starch comprising a modified starch having a degree of polymerization DPn of more than 1000 as required by independent Claim 23. *Woltjes, Klingler, Gilleland, Chakraborty, Fennema and Hui* alone or in combination fail to disclose or suggest a candy having a texture that is comparable to textures of products based on gelatin and is produced by extrusion molding as required by independent Claim 23.

Woltjes discloses a starch composition comprising a first fraction comprising cross-linked starch and at least a second fraction comprising depolymerised starch. *Woltjes* fails to disclose or suggest a modified starch having a degree of polymerization DPn of more than 1000 as admitted by the Patent Office. See Office Action, page 3, paragraph 3.

Klingler discloses a process for producing thermochemically modified starch along with the thin-boiling starches that are obtainable by the process and thermally reversible gel-forming dextrins. Nevertheless, *Klingler* fails to disclose or suggest a modified starch having a degree of polymerization DPn of more than 1000 and is instead directed to a starch (e.g., thin-boiled starch) with a reduced degree of polymerization, which teaches away from the present claims.

Gilleland discloses film-forming compositions that can comprise, on a dry solids basis, 25 to 75 percent by weight of certain starch derivatives having a DE less than about 1, 25 to 75% plasticizer, and 0.1 to 15% hydrocolloid gum. At no point does *Gilleland* disclose or suggest a modified starch having a degree of polymerization DPn of more than 1000 or a specific reason for using such as modified starch.

Similarly, *Chakraborty*, *Fennema* and *Hui* fail to disclose a modified starch having a degree of polymerization DP_n of more than 1000 in accordance with the present claims. In addition, none of the references teaches or suggests a candy having a texture that is comparable to textures of products based on gelatin and is produced by extrusion molding according to the present claims. As a result, the cited references alone or in combination fail to disclose or suggest each and every element of independent Claim 23.

Moreover, the cited references do not recognize the advantages and benefits of the claimed candy, and the skilled artisan would have no reason in the absence of hindsight to combine the references to arrive at the claimed invention because the references teach away from the claimed invention. According to *Chakraborty*, the starch jelly gum is prepared by employing the mogul method, i.e., a special moulding method using starch molds that is typically used in that field. See *Chakraborty*, column 6, lines 5-7 ("the starch jelly candy formulation is deposited into a mold") and example 2 ("deposited into starch molds"). To be suitable for being deposited into molds, a starch formulation must have a low viscosity. This may be achieved by either: 1) using either only small amounts of a native, not degraded starch (typically up to 5 % in water are possible in maximum) or, 2) when higher starch amounts are desired (which is typically the case) using a degraded starch.

A person skilled in the art is well aware of the fact that there exists a strong correlation between the molecular weight of the starch and the viscosity of the respective starch solution. Without the pending application as a template, a person skilled in the art would conclude from *Chakraborty* that its low amylose, low viscosity starch will not have a degree of polymerization DP_n of more than 1000 but a much lower degree of polymerization DP_n. This is because the skilled artisan would expect that, when using a starch having a degree of polymerization DP_n of more than 1000, the respective starch formulation would not be suitable for being deposited into a mold. This applies all the more because *Chakraborty* preferably uses 40 % to 90 % by weight of the low amylose, low viscosity starch. See *Chakraborty*, column 4, lines 1-6.

Finally, according to *Chakraborty*, the low amylose, low viscosity starch may be an oxidized starch. The skilled artisan understands that an acetylated and oxidized starch of potato typically has a DP_w of less than 200 (wherein DP_w >> DP_n). This further supports that

Chakraborty teaches towards a first starch having a much lower degree of polymerization DPn as required by Claim 23.

Based on the previous discussion, in view of the skilled person's general knowledge at the time the claimed invention was made, *Chakraborty* clearly teaches away from a formulation comprising a first starch having a degree of polymerization DPn of more than 1000. Rather, based on the whole teaching of *Chakraborty*, the skilled person is directed to use a first starch having a much lower degree of polymerization DPn.

In addition, *Woltjes* teach towards the use of the Mogul technology (see example 7 and 8 of *Woltjes*). Consequently, the skilled artisan viewing *Woltjes* would not consider using a first starch having degree of polymerization DPn of more than 1000 with Mogul technology for the same reasons as set forth above.

What the Patent Office has done is to rely on hindsight reconstruction of the claimed invention. Applicants respectfully submit that it is only with a hindsight reconstruction of Applicants' claimed invention that the Patent Office is able to even attempt to piece together the teachings of the prior art so that the claimed invention is allegedly rendered obvious. In particular, Applicants respectfully want to emphasize that based on the teachings of *Woltjes* or *Chakraborty*, which both teach towards the use of the Mogul technology, the skilled person would never have considered using a first starch having a degree of polymerization DPn of more than 1000 and thus would never arrive at the advantageous candy of the claimed invention. Instead, the claims must be viewed as a whole as defined by the claimed invention and not dissected into discrete elements to be analyzed in isolation. *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983); *In re Ochiai*, 71 F.3d 1565, 1572, 37 USPQ2d 1127, 1133 (Fed. Cir. 1995). One should not use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d at 1075. (Fed. Cir. 1988).

For at least the reasons discussed above, the cited references fail to disclose or suggest each and every element of independent Claim 23. Moreover, the cited references fail to even recognize the advantages, unexpected benefits and/or properties of a candy having a starch matrix in accordance with the present claims. As a result, Applicants respectfully submit that

independent Claim 23, along with any claims that depend from Claim 23, are novel, nonobvious and distinguishable from the cited references.

Accordingly, Applicants respectfully request that the rejection of the pending claims under 35 U.S.C. §103 be withdrawn.

Applicants further note that Claims 32-49 have been newly added. The new claims are fully supported in the specification, for example, in U.S. Patent Publication No. 2006/0134311, paragraphs 27 and 32 and the originally pending claims. Applicants respectfully submit that Claims 32-49 should be allowed.

Newly added independent Claim 41 is, in part, directed to a candy comprising a starch matrix comprising a microcrystalline-crosslinked network including a first starch comprising a starch having a DPn of more than 1000 and an amylose content of less than 20% and having a low retrogradation tendency. The candy has a rubber-elastic texture that is comparable to textures of products based on gelatin and is produced by extrusion molding. The amendments are supported in the specification, for example, in U.S. Patent Publication No. 2006/0134311, paragraphs 27, 32, 39, 41 and 43. As already detailed above, the desired low retrogradation tendency of the starch may also be attained by using a starch having a low amylose content. Again, the high degree of polymerization of the starch contributes to the improved texture of the candy.

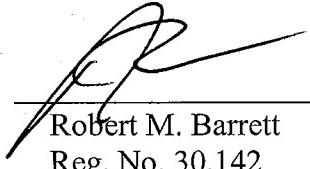
For the same reasons as set forth above, the cited references fail to disclose or suggest each and every element of independent Claim 41, and the skilled person viewing *Woltjes* or *Chakraborty* would not consider using a first starch using a degree of polymerization of more than 1000. As a result, Applicants respectfully submit that independent Claim 41, along with any claims that depend from Claim 41, are novel, nonobvious and distinguishable from the cited references.

For the foregoing reasons, Applicants respectfully request reconsideration of the above-identified patent application and earnestly solicit an early allowance of same. In the event there remains any impediment to allowance of the claims which could be clarified in a telephonic interview, the Examiner is respectfully requested to initiate such an interview with the undersigned.

Respectfully submitted,

K&L GATES LLP

BY



Robert M. Barrett
Reg. No. 30,142
Customer No. 24573
Phone No. 312-807-4204

Dated: April 6, 2011